STRATEGIC ALIGNMENT: A PROCESS MODEL FOR INTEGRATING INFORMATION TECHNOLOGY AND BUSINESS STRATEGIES

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Abstract

This paper develops a research model for examining the relationship between strategic business planning and strategic Information Technology planning. This model, termed the Strategic Alignment Model, is defined in terms of four planning domains -- Business Strategy, Information Technology Strategy, Organizational Infrastructure and Processes, and Information Technology Infrastructure and Processes -- each with their constituent components. This model is developed using two fundamental dimensions of the planning process: strategic fit and functional integration. A theoretical perspective of alignment across these two dimensions is developed using four attributes -- (1) *consistency*, (2) *completeness*, (3) *validity*, and (4) *comprehensiveness*. These attributes are used to develop a set of research propositions with important implications for the management of strategic I/T planning processes.

1.0 Introduction

The critical role of Information Technology (I/T) to current and emerging strategies of organizations has been well documented and discussed (Cash and Konsynski 1985, Rockart and Scott Morton 1984, McFarlan 1984, Barrett and Konsynski 1982, Malone et al. 1987). Research has focused on issues ranging from how strategic use of I/T restructures business processes and changes relationships between organizations (Cash and Konsynski 1985), to how types of technologies affect competition (Keen 1986, Malone et al. 1987). To the extent that I/T is becoming a critical component of organizations and organizational strategy, it is important to understand how the management of the I/T function is changing, and in particular, how the strategic planning processes of the firm relate to this function.

Strategic I/T planning has evolved significantly over the last three decades. In a pattern quite similar to business planning, I/T planning first focused on effective allocation of the firm's resources to I/T. I/T planning in this early era served the project manager and project sponsor by carefully delineating system requirements, by establishing goals and responsibilities for those involved in the system project, and by providing a means of integrating project controls with more general organizational financial controls. Examples of I/T planning methods reflecting this era include Business Systems Planning (IBM, 1981) and Critical Success Factors (Rockart, 1979). In general, most methodologies viewed the I/T plan as a *response* to a business strategy. While they varied in technique, these approaches sought to address the general themes of top-down planning and bottom-up implementation. That is, a general I/T architecture, defined in terms of technology, applications systems, and more recently data, was developed and implemented through a series of carefully segmented projects. (The reader should refer to Zmud (1986) for a more detailed review.)

Due, in part, to organizations that found ways to use information technology to affect their competitive position, I/T planning has evolved into a second era that

reflects a much higher level of interaction between the business strategy and I/T strategy (King, 1978; Pyburn, 1983). I/T planners and researchers called for an integrated strategy that *explicitly* recognizes the potential for I/T to shape or enable a business strategy (King, 1978; Zmud, et.al., 1986; Henderson, Rockart and Sifonis 1987). I/T planning methodologies began to reflect a more externally-oriented perspective directly incorporating techniques such as competitive analysis (Cash and Konsynski, 1985; Ives and Learmonth, 1984). While this view of planning is one based on integration, it has an underlying assumption that the formulated business strategy is relatively stable.

We believe that strategic I/T is now entering a third era. In this era, business strategy is not viewed as stable. Rather, in this view the organization is facing a highly turbulent, dynamic environment. Organizations may choose to be reactive to their perception of this environment or be proactive, i.e., enact a given environment (Daft and Weick 1984). To be an effective strategic resource, management of information technology must be understood in terms of this constantly changing competitive strategy.

Of particular importance to the effective management of I/T in this perspective is the recognition that the information technology market is also very dynamic. The management of the firm must be increasingly aware of how I/T decisions *position* the firm in the I/T market. The failure to adequately position the firm with respect to this market may result in an inability to leverage emerging technology that is vital to a business strategy. Similarly, a naive attempt to use I/T as a barrier to entry may result in a major capital investment that, much like the Maginot Line, can be easily by-passed with a new technology or through a strategic alliance with a technology vendor.

This need requires that management must understand the *strategic fit* between the formulation of an I/T strategy and the implementation of this strategy as an evolving I/T infrastructure. That is, as the firm positions itself with respect to an

emerging technology, it must also be able to restructure the I/T function and its existing architectures in such a way as to effectively implement this technology strategy. Analogous to the classical strategy- structure fit argument in business strategy, the firm must be able to achieve an effective strategic fit in the I/T domain. One has only to examine a long list of strategic I/T initiatives that have experienced failure (Kemerer and Sosa 1989) in order to appreciate the risks associated with the failure to adequately meet this requirement.

We define this new era of I/T Planning as *Strategic Alignment*. The Strategic Alignment Model that is developed here combines the traditional notion of *functional integration* with the concept of *strategic fit*. Functional integration builds upon Era II strategic I/T planning by recognizing the dynamic relationship between I/T and business strategies which allows these strategies to both respond to and shape each other. In Era III business and I/T strategy are viewed as critical aspects of one strategy: the firm's overall strategic position.

Strategic fit explicitly examines the relations between strategy formulation, i.e., choices that position a firm in a market, and strategy implementation, i.e., those that define the internal arrangements within the firm that are necessary to execute strategy. Its dimensions reflect an external-internal fit requirement that must be managed, focussing on both general organizational and I/T organizational aspects of the firm.

In Section 2, we define the four planning domains generated by these two dimensions. Each domain is defined in terms of the types of planning decisions made. This model provides the basis for a formal definition of *Strategic Alignment*. In Section 3, we apply the *Strategic Alignment Model* (SAM) to current I/T planning methods. The use of the SAM framework in this descriptive mode enables us to define four theoretical attributes of various I/T planning methods. In Section 4, we generate a series of propositions concerning the relationship between the attributes of an I/T

planning process and planning system effectiveness. Finally, Section 5 provides a brief conclusion.

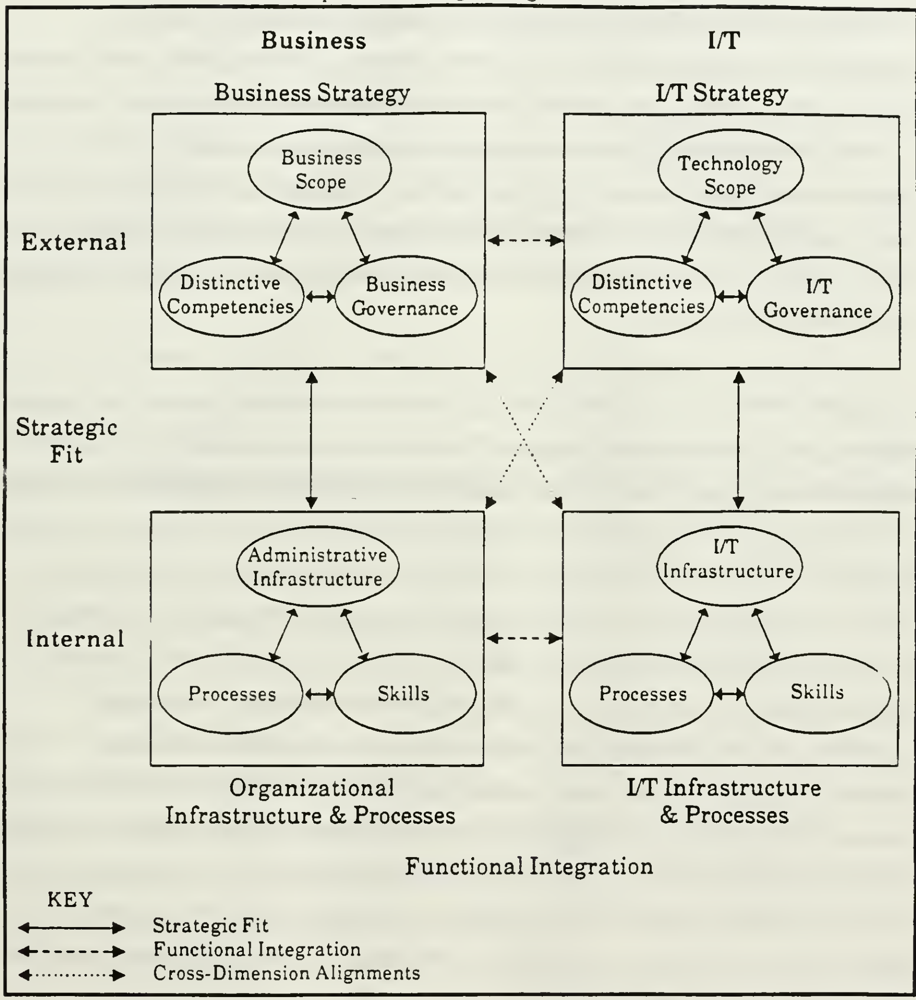
2.0 Four Domains of Strategic Planning

The Strategic Alignment Model shown in Figure 1 depicts four planning domains: *business strategy, organizational infrastructure and processes, I/T strategy and I/T infrastructure and processes*. The Business Strategy domain is defined in terms of the firm's *choices* pertaining to its *positioning in the product-market arena*. Strategy reflects the set of goals (ends), means (actions), and underlying assumptions pertaining to these choices. It covers a broad terrain and has been defined using different topologies and classifications (Hofer and Schendel 1978, Venkatraman and Grant 1986). However, most discussions of business strategy deal with questions of *business scope* (in terms of product-market choices) and the specific orientation to compete in the chosen market. The specific orientation of a strategy is viewed in terms of two components: *Distinctive Competencies* and *Governance Structures*. *Distinctive Competencies* refers to those attributes of strategy which contribute to a distinctive, comparative advantage over competitors in the product-market arena (Snow and Hrebiniak 1980). Common attributes include (but are not limited to): pricing, quality, value-added service, delivery channels and image. *Governance Structure* involves the extent to which *collaborative mechanisms*, such as value-added partnerships or strategic alliances, are used to obtain competitive advantage. This component of business strategy is critical since neither "pure" markets nor classical hierarchies alone define the set of available mechanisms for effective strategy.

The Organizational Infrastructure and Processes domain is defined in terms of the *choices* pertaining to the particular *internal arrangements that support the organization's business strategy*. They reflect the goals (ends), means (actions), and underlying assumptions pertaining to the design of management structure and work processes.

Figure 1

The Proposed Strategic Alignment Model



While there is a wide range of possible constructs for representing this domain. we focus on those components that are critically intertwined with the I/T and business strategy issues (Galbraith 1977, Lawrence and Lorsch 1967, Leavitt 1965): (a) *administrative infrastructure* that includes the organizational structure, roles and responsibilities necessary to execute the business strategy; (b) work *process* that includes the articulation of the work flow and its associated information flow that are necessary to execute strategies; and (c) *skills* and knowledge indicating the capability of the organization to implement a strategy. As indicated by Figure 1, choices made in this domain directly affect both the ability to execute business strategy (i.e., strategic fit) and the ability to establish critical requirements for the I/T infrastructure and processes (i.e., functional integration).

The Information Technology Strategy domain is defined in terms of the *choices* pertaining to the *positioning of the business in the information technology marketplace.* It reflects the set of goals (ends), means (actions) and underlying assumptions that relate to these choices. Three components underlie this strategy and have important parallels with business strategy. These are: (a) *technology scope*, (b) *distinctive competencies*, and (c) *governance structure.* Technology scope, analogous to business scope, refers to the types and range of I/T capability that will be made available to the organization. Strategic choices pertaining to scope often center on adoption of an emerging technology. For example, using expert systems to decentralize the underwriting authority to the independent agents enables new business strategies for an insurance carrier. While emerging technology is most often highlighted for its impact on strategy, technology scope also reflects how the firm is positioned within a wide range of existing technology. For example, the choice to adopt relational database technologies for improving the productivity of knowledge workers may be key to the business strategy of being an efficient provider of service.

Distinctive competencies refers to those choices that affect the ability of the firm to differentiate its I/T infrastructure. As with distinctive characteristics of a business

strategy, there are a number of characteristics that may differentiate the I/T strategy pursued. For example, the degree of connectivity reflected in the infrastructure can affect characteristics such as access to information, flexibility or cost. Decisions to adopt or provide standards such as operating systems (e.g., UNIX), communication protocols (e.g., OIS), application environments (MAPA, SQL, etc.) or hardware (e.g., common PC architecture), increase the potential for connectivity across vendors and directly affect flexibility and availability within and between organizations. Other factors that reflect the distinctive competency of the I/T infrastructure include price/performance, reliability or capacity. Each of these characteristics defines parameters within which the firm's I/T infrastructure must operate.

The *governance* issue in I/T strategy is parallel to governance in business strategy: the extent to which collaborative mechanisms are used to obtain technological advantage. Traditionally, I/T governance has focused on issues of privacy and security. As the role of information technology in interorganizational strategy increases (Barrett and Konsynski 1982, Cash and Konsynski 1985, Malone, Yates, and Benjamin 1987), the governance of I/T infrastructure emerges as an important element of I/T strategy. For example, Rotemberg and Saloner (1989) discuss the distinction between cooperative and competitive advantage in the context of relative ownership of information technology networks. More specifically, the networks of ATMs and airline reservation systems illustrate the complexities of the governance structure in terms of ownership/influence relationships and the relative ability of the participating firms to provide proprietary services across the network. To the extent that the governance structure of a key technology may affect choices relating to scope or distinctive competencies, e.g., by affecting the rate at which an innovation can be absorbed, this choice set can greatly affect the overall technology strategy.

The Information Technology Infrastructure and Processes domain is defined in terms of *choices* pertaining to *internal arrangements and processes that support I/T strategy and affect types of I/T products and services delivered to the organization*. It

reflects the goals (ends), means (action) and underlying assumptions that relate to these choices. This is parallel to the organizational infrastructure and processes of the business domain.

The three components of this domain are *architecture, processes* and *skills.* Architecture represents the definitions, governing policies, and implied priorities for three key I/T architectures: applications, data, and technology configurations. The applications architecture is the interrelation of system products that manipulate, store or retrieve data in order to support the information processing requirements of the firm. The data architecture is a definition and implementation of data entities, relationships and policies that determine the integrity and accessibility of data. Finally, the technology configuration component is the set of hardware, software and communications technologies that determine the specific characteristics of the embedded technology infrastructure.

The *processes* component relates to work processes that are critical to the efficient and effective operation of the I/T infrastructure. Such processes would include methodology and procedures for development of systems, security/backup procedures, data center operations, cost/control systems and so on. In essence, these are the underlying production processes for managing and adapting the I/T infrastructure.

Finally, the human resource component is a critical component of the I/T infrastructure and processes. This component reflects the need for specific skills, knowledge, or values within the I/T function. Martin (1982), Mumford (1981) and others point out that introduction of changes in architectures (i.e., adopting a data resource management strategy) or processes (adopting computer aided software engineering techniques) often implies major changes in the skill sets of the work force.

2.1 Cross-Dimension Alignment

As shown in Figure 1, the two dimensions of strategic fit and functional integration link the four planning domains. We now can define the concept of Cross-Dimension Alignment as a *planning context that considers both Strategic Fit and Functional Integration*. In essence, we argue that the management of the I/T function should be understood in terms of its impact on strategic fit. For example, the impact of emerging I/T should be assessed in terms of how it might affect the fit between strategy and structure. Similarly, at an operational level, the decisions to create a particular fit between strategy and infrastructure are the basis to define the I/T infrastructure and processes. This perspective can be represented as a triangle overlaid on the Strategic Alignment Model. We argue there are four general types of cross-dimension alignment; *technology exploitation, technology leverage, strategy implementation*, and *technology implementation*. As shown in Table 1 each of the types reflects a dominant perspective found in various I/T planning approaches.

Our argument is that the planning processes that examine only bivariate relationships are seriously limited. For example, a planning process that considers the integration of business and I/T strategies may help ensure the formulation of new I/T-enabled business strategies, but it does not explicitly assess the *implications for implementation of the strategies*, i.e., the fit between business strategy and organizational infrastructure and processes. In the larger body of theory and research rooted in the alignment concept, serious limitations of bivariate perspective include possible inconsistencies created by combining a series of bivariate analyses (Child 1975, Miller 1981) and the generation of errors of logical typing (Bateson 1979).

The cross-dimension alignment perspective attempts to overcome the limitations of bivariate fit. In essence, we propose that effective strategic I/T management processes must address both functional integration *and* strategic fit. In fact, most current I/T planning processes adopt this perspective. For example, *enterprise modeling*

Table 1
Four I/T Planning Perspectives

Label	Cross-Domain Perspective	Common Domain Anchor	I/T Planning Method Example
(1) Technology Exploitation		Technology Strategy	Opportunity Identification (Sharpe 1989) Value Chain Analysis (Cash)
(2) Technology Leverage		Business Strategy	Technology Scanning ()
(3) Strategy Implementation		Business Strategy	CSF (Rockart 1979) Enterprise Modeling (Martin 1982?)
(4) Technology Implementation		Technology Strategy	Service-level Contracting ()

★ Domain Anchor

(Martin 1982) represents a process that explicitly analyzes strategic fit (i.e., fit between business strategy and organizational processes) and functional integration (i.e., fit between organizational processes and I/T architectures). However, this process is framed by the assumptions and decisions of an *a priori* strategic business planning process. That is, *enterprise modeling*, as most often described, does *not* attempt to address how I/T could enable new business strategies.

In the following subsections, we describe each of these four general types of I/T planning perspectives, with illustrative planning methods in each.

2.1.1 Technology Exploitation. In recent years, several cases have been cited where I/T has challenged, influenced or shaped business strategy (McFarlan 1984, Rockart and Scott Morton 1984, Wiseman 1985). Technology exploitation can be viewed in terms of understanding how I/T choices enable or threaten possible strategy/structure alternatives. This perspective may be appropriate when defining planning for strategy types such as a Prospector (Miles and Snow 1978) in that one of the critical components in the planning effort is how I/T can help to create strategic advantage. Indeed, part of the current excitement about I/T is due to the potential that I/T offers to alter the range of strategic options available to businesses (Johnston and Vitale 1988). It is important to note that this cross-dimension perspective involves the consideration of not only the impact of information technology on business strategy but also the *implications* for organization and management processes. Examples of I/T planning methods which reflect this perspective are described by Sharpe (1989), and Wiseman (1985). In many cases these methods include using value chain analysis as an analytic tool to examine opportunities for business and I/T integration (e.g., linking a component of a supplier's value chain directly to that of its customer) and to examine the resulting implications for internal redesign of the value chain.

2.1.2 Technology Leverage. In contrast to technology exploitation, *technology leverage* involves the formation of an I/T strategy that best supports a chosen business strategy

in combination with the assessment of how these choices affect existing I/T infrastructure and processes. In this sense, such an approach is similar to the strategy perspective of an Analyzer (Miles and Snow 1978). For example, USAA embarked on a joint development effort with a key vendor in order to create and adopt an information technology for document handling. This strategy required them to make major changes to the existing I/T infrastructure across all three architectures: applications, data and configuration. This process reflects *technology leverage* in that it involves the consideration of not only the *impact* of business strategy on the I/T strategy (i.e. position the firm in a strategic alliance in order to leverage a new technology scope) but also the *implications* for the I/T infrastructure and processes required for successful implementation. Methodologies reflecting this perspective emphasize technology scanning, technology selection and an assessment of the implications for migrating current infrastructure.

2.1.3 Strategy Implementation. Here, the focus is on the traditional conceptualization of business strategy implementation through organizational structure and processes and the associated I/T infrastructure. *Strategy implementation* is a cross-dimension perspective that involves the assessment of the *implications* for organizational and management processes of a business strategy as well as the *impact* of organizational and management processes on the requirements for particular I/T infrastructure and processes. This approach emphasizes detailed analysis of business processes and their demands on I/T products and services. Since this perspective looks within the firm in order to execute a given strategy it often reflects a Defender type strategic planning process (Miles and Snow 1978). Perhaps the most common I/T planning approach, this perspective is reflected by methodologies such as CSF (Rockart 1979) and Enterprise Modeling (Martin, 1982).

2.1.4 Technology Implementation. This perspective places the I/T function as an internal service organization. Terminology such as a business within a business or the information economy reflect a perspective that the I/T function services an internal

market. The planning perspective emphasizes the needs of the organizational customer and, thus, reflects business strategy only indirectly. This cross-dimension perspective requires that the I/T function integrate its products and services with the organization while simultaneously progressing towards implementing a technology strategy. That is, the strategic fit is one that centers on the technology itself. This perspective is often viewed as necessary to ensure effective uses of the I/T resources and be responsive to a growing end user population. Methodologies reflecting this perspective often reflect market analysis and service contracting approaches. Examples include end user need surveying, service level contracting, and functional planning.

The above four perspectives reflect a theme--namely, a top-down orientation where either the business strategy or the I/T strategy direct subsequent implementation considerations. However, as discussed by Henderson and Venkatraman (1989), *each perspective could reflect a bottom-up orientation*. Here, either the current organizational infrastructure and processes or the current I/T infrastructure and processes *signal* the implications for strategic choices at the level of business and I/T strategies. Thus, while a top-down orientation may reflect the preference of professional planners, the Strategic Alignment Model (as shown in Table 1) can be used to describe a range of perspectives that could also support the notion of internally consistent, bottom-up analysis of a cross-dimension relationship resulting in four more planning perspectives.

In the following section, we will propose four theoretical attributes of effective I/T planning methodologies. These attributes will then be used to hypothesize the relationship between I/T planning processes and the effectiveness of the planning system.

3.0 Four Theoretical Attributes of Strategic Alignment

In this section we define four attributes of a planning process; consistency, completeness, validity and comprehensiveness. Each attribute is defined in terms of the

pattern of analysis enacted by the planning methodology. The Strategic Alignment Model provides the framework for defining these patterns. In the following sections, we define each attribute and formulate a research proposition that relates this dimension to planning effectiveness.

3.1 Consistency in Cross-Dimension Alignment

As discussed in Section 2, we argue that a planning process that considers only bivariate relationships will be less effective than one that simultaneously considers strategic fit and functional integration. To capture this notion more formally, we define consistency *as an explicit analysis that examines the relationship between all choice sets necessary to form a given cross-dimension alignment perspective.* As discussed earlier, there are four general types of cross-dimension alignment, each involving three distinct choice sets. Thus, a consistent planning process for Technology Exploitation would consider the cross impacts of Technology Scope on Business Scope, Technology Scope on Distinctive Competencies and so on. Even within the structure of the Strategic Alignment Model, the potential complexity of this process is evident. Assuming a uniform directionality, (an assumption we will soon relax), a consistent planning process must examine 3X3X3 choice sets. Our initial proposition is stated as:

P1: The effectiveness of the planning process increases in direct proportion to increases in planning process *consistency*.

A measure of consistency would require both an assessment of the extent to which the relationship between any two choice sets is examined and an additive function that measures consistency in terms of the number of such analyses completed and their relative importance to the organization.

The rationale for this proposition lies in the risk of explicitly examining the interactions among these *choice sets*. While for any particular organizational setting a

given interaction may be unimportant, the proposition implies a generally positive relation between the number examined and planning effectiveness.

3.2 Completeness

It is clear that considerations of any one of the four types of cross-dimension alignment will leave unchallenged one domain and its associated relationships. For example, *Technology Exploitation* (Table 1) does not explicitly address (i.e., takes as given) issues relating to the I/T infrastructure and processes and is therefore *incomplete*. Our definition of completeness is a *closed loop planning process that explicitly examines interactions among the choice sets for all four planning domains*.

The notion of a closed loop process implies a starting point. We use the term *domain anchor* to identify the initial planning domain reflected in the planning methodology. For example, Enterprise Modeling uses Business Strategy as its domain anchor. That is, the assumptions and decisions surrounding this domain provide a starting point for subsequent analysis. In general, a complete analysis only occurs when all choice sets are examined explicitly. In a sense, completeness reflects *single loop learning* (Argyris, 1977) in that the planning process will involve adjustments in behavior with respect to the given domain anchor. Note also that every *complete* analysis is also consistent; the reverse is not true.

Proposition 2 reflects the risk incurred by using incomplete planning processes. In essence, an incomplete planning process relaxes assumptions concerning the degree of interaction among choice sets. Planning system effectiveness will increase to the extent that relaxation of the constraints is an inappropriate simplification. Our second proposition is:

P2: Planning system effectiveness will be greater for *complete* processes than for any type of *consistent*, cross-dimension alignment.

As stated above, this proposition assumes all choice sets have a significant level of interaction. In Section 4, we will introduce a contingency perspective in order to relax this assumption based on the characteristics of the task environment.

It is interesting to note that one approach to achieving a complete planning process would involve executing two consistent, cross-dimension planning perspectives. Such a practice highlights the need to understand the characteristics of particular planning methodologies so that their selection does in fact create a complete process. Inappropriate matches could lead to planning failure. For example, in one organizational study by the authors, a two step planning process was implemented that proved to be very ineffective. A post audit showed that the first step reflected a *Technology Exploitation* and the second *Strategy Implementation*. Both planning processes used well-known approaches and were well-executed. However, as shown in Table 1, neither approach explicitly addresses *Strategic Fit* from an I/T perspective. As a result, major issues in performance and costs of migrating existing systems were not considered. These factors proved to be a major contributor to the project's failure. Such an example highlights the risks associated with an incomplete planning process.

3.3 Validity

A concern raised by Churchman (1971), Henderson and Sifonis (1988), Mason and Mitroff (1981), Weick (1979) and others relates to the potential threat to *validity* of a decision-making process introduced by the existence of a *domain anchor*. Validity is the degree to which a planning process can be systematically biased. One possible solution to this threat is to surface and examine the assumptions underlying a given anchor. This alternative can involve implementing a process that challenges the assumptions of this domain anchor or frame of reference (Mason and Mitroff 1981). The process of surfacing and challenging assumptions is analogous to the concept of double-loop learning. Double-loop learning, Argyris (1977), can be thought of as a process that challenges the existing frame of reference used by the organization for

problem solving and control. In contrast to single-loop learning, a double-loop learning process does not seek to restore or resolve deviation from an existing set of concepts or standards, but rather attempts to challenge and perhaps reformulate these concepts or standards.

One example of an I/T planning process that explicitly addresses the issue of validity is illustrated by the use of socio-technical processes (Mumford 1981, Bostom and Heinen 1977). This approach explicitly separates the design of a social system solution from the design of a technology solution. The separation offers the potential to challenge the bias of the technologist as well as the social system designer. An organization could implement this by generating an organization-directed, bottom-up process that begins in the organizational structure and process domain, moves clockwise to identify strategic opportunities, identify critical technology and then implement the I/T strategy via I/T infrastructure and process. Simultaneously, a technology-directed processa that begins in the I/T strategy domain could reflect a complete top-down technology exploitation and technology implementation perspective. The combination of the approaches provides a means to challenge embedded assumptions and execute a type of dialectic planning.

The concept of bi-directional linkage between two planning domains, e.g., business strategy and organization, is often advocated (King 1978, Pyburn 1983). For example, iterative or adaptive planning is used to emphasize the desired state of exploring *both* strategy from an organization perspective *and* organization from a strategy perspective. However, it is much easier to draw arrows on paper that point in opposite directions than it is to actually enact an iterative management process that views issues from opposite perspectives. We argue that a valid process must achieve the ideal of adaptive processes while also generating a consistent cross-dimension alignment. While it may be possible to construct a single planning event that would achieve such ends, we believe it is more likely to require multiple planning processes. Of course, executing multiple planning processes carries additional cost, and hence the

need is to demonstrate that such efforts in fact result in measurably improved effectiveness of the strategic I/T management process. To this end, we develop in Section 4 a set of propositions concerning the impact of validity on the effectiveness of I/T planning processes.

An issue that is separable from completeness and validity is the degree of comprehensiveness found in a given planning method. For example, an alternative approach to Enterprise Modeling is found in Critical Success Factors (CSF). These two approaches both reflect a Strategy Implementation (Table 1) perspective but differ significantly with respect to the level of detail involved in the analysis. Rockart (1979), for example, referred to the CSF concept as a "quick and dirty" BSP (an early form of Enterprise Modeling). The level of comprehensiveness introduces a fourth attribute of the planning process.

3.4 Comprehensiveness

The fourth attribute of the planning process, *comprehensiveness, focuses on the level of detail required to complete the analysis*. Historically, the I/T field has been influenced by a desire to minimize the risk of omitting a key detail in analysis. Thus, Enterprise Modeling (Martin 1982) attempts to define all goals and all business processes of the firm so as to ensure the resulting architectures are complete and consistent. Some advocates of a data-oriented approach to strategic I/T planning, for example, argue for an outcome that defines the total set of all data entities and their relationships (Martin 1982). The implementation process for the approach then segments this total data model in order to allow subset-by-subset implementation.

This view of planning is in stark contrast to planning processes that advocate a high degree of focus. Critical Success Factor Planning (Rockart 1979), for example, does not attempt to model all processes, only those that "are critical to the ongoing success of the firm". In this view, the risk of omitting key details is increased in

return for a focus on high impact opportunities. Further, the costs, time and complexity of the planning process are greatly reduced. Such approaches are often recommended when the competitive environment is unstable and when a long, detailed "engineering" of a strategy appears infeasible. And yet, these approaches have been criticized for their insensitivity to a range of potential method biases (Davis 1979) that are ultimately linked to their explicit omission of specific details.

We propose that the degree of comprehensiveness is a fourth parameter of a planning process and may account for process effectiveness. That is, a consistent planning process (at various levels of validity and completeness) can be carried out at various levels of *comprehensiveness.* As such, the level of detail generated during the process may account for planning system performance. As we will discuss in Section 4.0, organizational context issues such as the stability of the competitive environment may help to determine when a given level of comprehensiveness is warranted.

4.0 Research Proposition

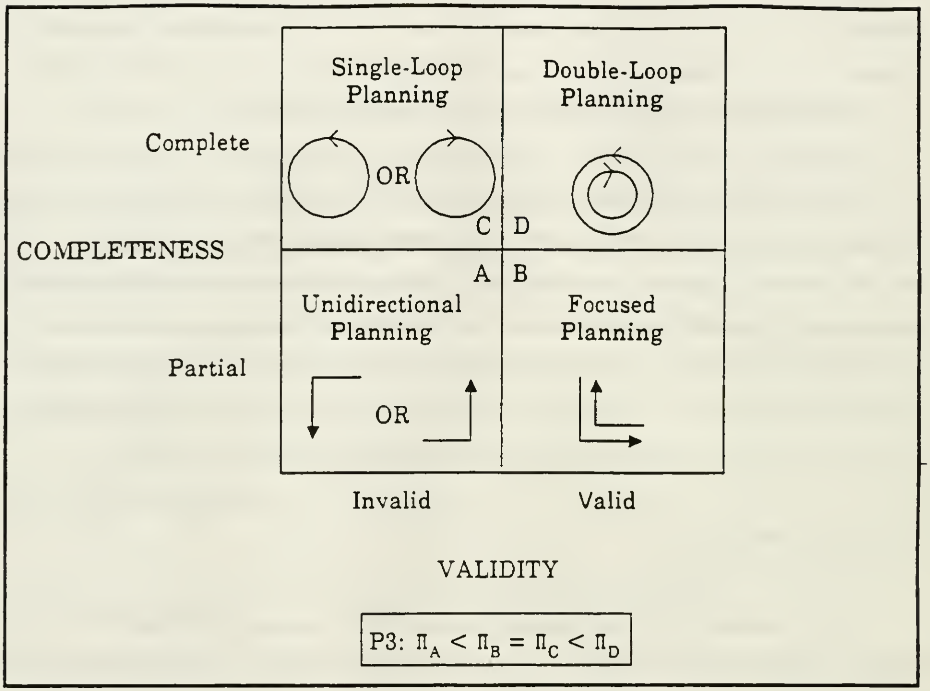
In this section, we expand upon the previous two propositions in order to address the attributes of validity and comprehensiveness. Figure 2 shows the proposed relationship between completeness and validity in relation to planning system effectiveness. Note that a partial planning process is assumed to be a consistent cross-dimension alignment.

In essence, Figure 2 reflects a proposed tradeoff between completeness and validity. For example, under what conditions will a complete process that invokes a dominant domain anchor generate superior planning system effectiveness? We develop the following three propositions.

P3A: On *average*, a unidirectional, cross-dimension alignment (i.e., consistent) is the least effective form of I/T planning.

Figure 2

I/T Planning Effectiveness



The rationale for this proposition lies in both the risk associated with incompleteness (i.e., exclusion of one domain of the Strategic Alignment Model) *and* also the failure to challenge the domain anchor.

P3B: On average, single-loop planning (complete but invalid) and focused planning (incomplete but valid) will be equally effective and superior to unidirectional consistent planning.

This proposition proposes increased planning effectiveness by addressing either the completeness or validity dimension. Both forms of planning are currently used (Rockart 1979, Boynton and Zmud 1987). Due to lack of an a priori theory on the relative importance of completeness versus validity, the proposition does not further delineate the relative effectiveness of these two approaches.

P3C: On average, double-loop planning will be the most effective form of strategic I/T planning.

This proposition argues that a complete and valid planning proce s will be most effective. Such an approach not only addresses all planning domains but seeks to challenge the assumptions of a single domain anchor. However, a major limitation of a double loop planning process is the cost and time associated with examining the large number of interrelated choice sets. Thus, we propose the level of comprehensiveness will be an important factor in these types of planning processes. Specifically, we propose:

P4A: Under conditions of high environmental uncertainty, double-loop planning will be more effective than single-loop or focused planning.

P4B: Under conditions of high environmental uncertainty, a high level of comprehensiveness in the planning processes will be less effective

These propositions argue that the level of *validity* and *comprehensiveness* of the planning process should reflect *the level of environmental uncertainty* perceived by the firm. To the extent that uncertainty is high, the stability of any given planning assumption is problematic (Fredrickson 1984). As such, attempts to minimize the risk of omission of details (high comprehensiveness) during the planning process will be ineffective. Similarly, the planning process should attempt to surface and explicitly explore critical assumptions for all given domains.

While each of these propositions could be expanded, they serve to highlight how the Strategic Alignment Model can be used to systematically explore the characteristics of various strategic I/T planning methodologies. Ultimately, introducing the notion of contingencies, i.e., organizational context, suggests that effectiveness of a planning process requires a selection of a process that fits the organizational environment. The Strategic Alignment Model provides a model to differentiate among planning processes and, hence, provides the foundation for building a *prescriptive* theory for strategic I/T planning.

5.0 Conclusion

There is increasing agreement that the potential use of information technology should be an integral part of strategic business planning. Unfortunately, while such a statement has high face validity it says little about how the strategic thinking processes of the firm should be changed to reflect this need. The Strategic Alignment Model expands upon this general need by defining critical choices that must be examined and by developing a basis for evaluating and, hence, choosing a particular planning method.

The Strategic Alignment Model argues that a strategic planning process must address both strategic fit (internal and external alignment) and functional integration (business and I/T alignment). The SAM provides the framework to define four

attributes that characterize alternative I/T planning processes: consistency, completeness, validity and comprehensiveness.

The set of propositions illustrate how the effectiveness of any given planning process relates to these four attributes. Further, the potential effect of major contingencies such as environmental uncertainty on planning process effectiveness is illustrated. To the extent that these or related propositions hold true, maximizing the effectiveness of a given strategic planning process will require an appropriate *selection* of planning method. Further, a sequence of planning processes can be made more effective through selection of methods that maximize the effectiveness of the overall planning system, e.g., create double loop planning.

Ultimately, the Strategic Alignment Model reflects the impact of various types of risk on planning effectiveness. Incompleteness introduces risk associated with relaxing or taking as given the state of any one domain anchor. Invalid planning processes incur the risk of method bias (i.e., effect of an unchallenged domain anchor). Low comprehensiveness reflects the risk of omitting critical elements or details during analysis. To the extent that these risks are understood, selection of a planning method becomes a fundamental issue of risk/return and, hence, an *important* and ongoing responsibility of strategic management. This research seeks to build a model that will aid managers in making this choice.

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